MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2016/2017

PSM0325 – INTRODUCTION TO PROBABILITY AND STATISTICS

(Foundation in Information Technology / Life Sciences)

29 MAY 2017
9.00 a.m. – 11.00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of **THREE** pages excluding the cover page and the Appendix.

2. Answer **ALL FIVE** questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please write all your answers in the Answer Booklet provided. All necessary working steps **MUST** be shown.

4. **Statistical table** is provided.

Instruction: Answer all **FIVE** questions.

Question 1 (10 marks)

Given below is the relative frequency distribution table for the age of 50 selected students who studying in Multimedia University (MMU) under various program.

Age	Relative frequency
18 - 21	0.42
22 - 25	0.24
26 - 29	0.18
30 - 33	0.06
34 - 37	0.08
38 - 41	0.02

By referring to table above, calculate the mean, variance and standard deviation for this data. (10 marks)

Question 2 (10 marks)

a. In a certain university, the students must join one club for a current semester. Out of all students, it is known that 60% of them are joining Language Club, 25% Recreational Club and the remaining join Self Defense Club. It is also known that only 8%, 5%, and 5%, respectively are the committee member.

i) Draw a tree diagram. (1 mark)

ii) If a student is a committee member, what is the probability that the student joins Language Club? (3 marks)

b. The following table shows the number of letters (X) received by a receptionist of a company each day.

Number of letters	0	1	2	3	4	5	6
P(X)	$2m$	$4m$	$3m$	0.1	$4m$	m	m

i) Determine the value of the constant m. (1 mark)

ii) Find the probability that the receptionist receives not less than three letters in a day. (1 mark)

iii) Find the variance of X. (4 marks)

Continued...

Question 3 (10 marks)

a. 6% of an electrical component produced by a factory is defective. 12 of the electrical components are packed into a box.

i) A box is randomly selected for inspection. Find the probability that there are at least 3 defective components. (2 marks)

ii) What is the percentage that a selected box consists of 10 good components? (2 marks)

b. The diameter of a certain tube use in a surgery is normally distributed with 12.5mm and a standard deviation of 0.2mm.

i) What is the percentage of tube with diameter within 0.66mm of the population mean? (3 marks)

ii) If the diameter is less than 12mm or greater than 13mm, the tube does not fit properly. A doctor just bought 1000 of the tube, how many wrong-sized tubes will this doctor expected to get? (3 marks)

Question 4 (10 marks)

a. Table below shows the price for each softener's brand which has been sold in Carrefour hypermarket.

Softener	Price for 1 litre (in RM)
Ava	2.54
Besty	1.54
Cleany	2.84
Doury	8.88
Electra	3.20
Fabby	2.54

Construct a sampling distribution of sample mean with sample size of five, can be selected from this population. (5 marks)

b. According to a survey conducted by one of the customer organization in Malaysia, the price for toiletries sold in MM hypermarket is normally distributed with a mean of RM11.99 and a variance of RM38.64. Find the probability that the mean price for toiletries sold in MM hypermarket for a random sample of 60 customers is less than the population mean by at least one-third of the standard deviation. (5 marks)

Continued...

Question 5 (10 marks)

In order to improve the quality of the road signs in Malaysia, modifications to the existing design was done. With the present type of road signs, the maximum distance at which drivers are able to read a particular road sign is normally distributed with mean of 150 meter. In a study done using modified design of road signs on a random sample of 45 drivers, it was found that they have mean maximum sign reading distance of 160.3 meter with standard deviation of 31.7 meter.

a. Based on the time taken by 45 drivers, construct a 97% confidence interval for the mean time taken by all the trainees to complete the course.

(4 marks)

b. Test at 2.5% level of significance if the modification to the design is beneficial.

(6 marks)

End of Paper

APPENDIX

FORMULA

For Grouped Data

1. Mode = $L + \left[\frac{f_m - f_B}{(f_m - f_B) + (f_m - f_A)}\right] c$

2. Median = $L + \left[\frac{\left[\frac{\sum f + 1}{2}\right] - F}{f_m}\right] c$

3. Mean =

Sample	Population
$\bar{x} = \frac{\sum mf}{\sum f}$	$\mu = \frac{\sum mf}{\sum f}$

4. Variance =

Sample	Population
$s^2 = \frac{\sum m^2 f - \frac{(\sum mf)^2}{\sum f}}{(\sum f) - 1}$	$\sigma^2 = \frac{\sum m^2 f - \frac{(\sum mf)^2}{\sum f}}{\sum f}$

5. Standard Deviation = $\sqrt{Variance}$